WHAT IS CLAIMED IS:

1.   A device for controlling a video game, comprising:

an input having a movable reference surface;

an imager operable to capture images of the reference surface; and

a movement detector operable to detect movement of the reference surface based on one or more comparisons between images of the reference surface captured by the imager and to generate output signals for controlling the video game based on the detected movement.

2.   The device of claim 1, wherein the input is a joystick and the reference surface moves in response to movement of the joystick.

3.   The device of claim 2, wherein the input comprises a joystick shaft having a lower portion coupled to a base, and the reference surface corresponds to an area on the lower portion of the joystick shaft.

4.   The device of claim 3, wherein the base includes a socket and the lower portion of the joystick shaft includes a spherical element positioned in the base socket and having a surface region corresponding to the reference surface.

5.   The device of claim 1, wherein the input comprises a steering wheel coupled to a base through a steering column, and the reference surface tracks movement of the steering column.

6.   The device of claim 5, wherein the reference surface corresponds to a surface of the steering column.

7.   The device of claim 1, wherein the imager includes multiple image sensors each operable to capture images of the reference surface.

8.   The device of claim 1, wherein the movement detector is operable to detect movement of the reference surface by tracking features of the reference surface across multiple images.

1   9.   The device of claim 8, wherein the movement detector is operable to
2   track structural features of the reference surface across multiple images.

1   10.   The device of claim 8, wherein the movement detector is operable to
2   compute position coordinates for the reference surface by correlating features of
3   the reference surface across multiple images.

1   11.   The device of claim 10, wherein the movement detector is operable
2   to map the computed position coordinates to the output signals for controlling the
3   video game.

1   12.   The device of claim 1, further comprising at least one light source
2   for illuminating the reference surface.

1   13.   A device for controlling a video game, comprising:
2   a movable input;
3   an imager attached to the input and operable to capture images of a scene
4   in the vicinity of the input; and
5   a movement detector operable to compute three-dimensional position
6   coordinates for the input based at least in part on one or more comparisons
7   between images of the scene captured by the imager and to generate output
8   signals for controlling the video game based on the computed position
9   coordinates.

1   14.   The device of claim 13, wherein the movement detector is operable
2   to compute rotational position of the movable input based at least in part on one
3   or more comparisons between images of the scene captured by the imager.

1   15.   The device of claim 13, wherein the input is a device for simulating
2   a sports game.

1   16.   The device of claim 15, wherein the input is formed in the shape of
2   a glove.

1   17.   The device of claim 13, further comprising an acceleration sensor
2   unit attached to the input and operable to generate signals indicative of

3 movement of the input in three-dimensions, wherein the movement detector is

4 operable to detect movement of the input based at least in part on the signals

5 generated by the acceleration sensor.

1   18.   The device of claim 17, wherein the movement detector is operable

2 to compute coarse three-dimensional position coordinates for the input based on

3 the signals received from the acceleration sensor unit and to compute refined

4 three-dimensional position coordinates for the input based on the computed

5 coarse three-dimensional position coordinates and comparisons between images

6 of the scene captured by the imager.

1   19.   The device of claim 17, wherein the movement detector is operable

2 to periodically correct three-dimensional position coordinates for the input

3 computed from signals generated by the acceleration sensor based on position

4 coordinates computed from comparisons between images of the scene captured

5 by the imager.

1   20.   The device of claim 17, wherein the movement detector is operable

2 to compute acceleration information relative to position information computed

3 from comparisons between images of the scene captured by the imager.

1   21.   The device of claim 17, wherein the movement detector is operable

2 to compute a measure of movement rate of the movable input based on the

3 signals received from the acceleration sensor unit, and the imager captures images

4 of the scene at a variable rate that is set based on the computed movement rate

5 measure.

1   22.   The device of claim 13, wherein the movement detector is operable

2 to detect movement of the input by tracking features of the scene across multiple

3 images.

1   23.   The device of claim 13, wherein the movement detector is operable

2 to compute position coordinates for the reference surface by correlating features

3 of the reference surface across multiple images.

1   24.   The device of claim 13, wherein the movement detector is operable

2   to map the computed position coordinates to the output signals for controlling the

3   video game.